
**Temporal-spatial association between Tertiary
lamprophyre dykes and epithermal Au-Ag
mineralization in Sonora, northwestern Mexico**

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Lamprophyres are mafic to intermediate volatile-rich igneous rocks that occur mainly as dykes and are often been associated with metallic (mainly Au) ore deposits. Although clearly in most cases the relationship between the lamprophyres and the mineralization is not genetic, there are numerous cases where there exists a spatial and/or temporal relationship between them.

The present work focuses on the petrology and geochronology of the lamprophyre dykes of the Hermosillo area, Sonora, northwestern Mexico comparing their age and genesis to that of known Au-Ag ore deposits in the region. In Sonora, the lamprophyres commonly crosscut the 90–40 Ma Sonoran batholith; however, they have also been observed in hydrothermal gold deposits in the north-central and northwestern portions of the State. In the Hermosillo area the dykes vary in width from about 10cm to as much as 5m. They vary in mineralogy from hornblende-phyric spessartite to phlogopite-phyric kersantite, which have medium-K calc alkaline and shoshonitic affinities respectively.

In the area of study ⁴⁰Ar/³⁹Ar geochronology for the lam-

prophyre dykes has yielded ages from ≈ 22 to ≈ 25 Ma, which fall within the period through which northwestern Mexico began shifting from an active continental margin to a continental rift; eventually leading to the separation of the Baja California from the North America Plate. While Cu-porphyry mineralization dominates through the late Cretaceous-early Tertiary, Epithermal Au-Ag mineralization is the most common through the mid-Tertiary, coincident with the formation of the lamprophyre dykes.

The initial stages of continental extension should allow for preferential melting of the metasomatized mantle after the long-lived subduction of the Farallon Plate beneath North America. This could possibly be a common source for the formation of lamprophyres and precious-metal enriched fluids, the ascent and deposition of which would also be facilitated by extension. Perhaps it would be of interest to consider transitional tectono-magmatic environments of interest for precious-metal exploration.